Jing Guo

Curriculum Vitæ

✉ *dev.guoj@gmail.com*
guoj.org
guojing0
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Education

Winter 2022 – Summer 2025 **M.Sc. Mathematics**, *Universität Regensburg*, Bavaria, Germany.
Thesis: *A Tale of Two Arcs: The Circle Method and Waring's Problem*
Supervisor: Prof. Dr. Guido Kings
Thesis Grade: 1.7 / 5.0 (gut/good)

Fall 2016 – Spring 2020 **B.S. Mathematics**, *University of Utah*, Salt Lake City, UT, USA.
Minor in Computer Science

Exchange Experience

Fall 2020 – Summer 2021 **Budapest Semesters in Mathematics (Online)**, Budapest, Hungary.

Spring 2019 **Budapest Semesters in Mathematics**, Budapest, Hungary.

Fall 2018 **Math in Moscow**, *Independent University of Moscow*, Moscow, Russia.

Professional Experience

Oct. 2023 – May 2024 **Student Research Assistant (Studentische Hilfskraft)**, *Fakultät für Informatik und Data Science*, Universität Regensburg.
Description: Implemented and optimized fixed-parameter tractable (FPT) algorithms for counting graph homomorphisms in SageMath.

June 2023 – Sep. 2023 **Research Programmer**, *SageMath*, Google Summer of Code.
Supervisor: Dr. Benjamin Hutz
Description: Generalized height algorithms in number fields and other improvements.

June 2022 – Sep. 2022 **Research Programmer**, *SageMath*, Google Summer of Code.
Supervisor: Dr. Benjamin Hutz and Alexander Galarraga
Description: Fixed bugs, improved implementations of height functions, and implemented the Arakelov–Zhang pairing of rational maps in algebraic geometry.

Nov. 2021 – Feb. 2022 **Common Lisp Software Intern**, *Atlas Engineer*, USA and Germany.
Document-structure navigation features, optimizing components for performance and maintainability, improving documentation, addressing user issues, and expanding tests.

Summer 2021 **Research Assistant**, *Budapest Semesters in Mathematics (Online)*, Budapest, Hungary.
Supervisor: Dr. András Gyárfás
Description: Studied the linear Turán number of the Crown C_{13} in linear 3-graphs.

Sep. 2020 – Oct. 2020 **Research Programmer (Contract)**, *University of Bergen*, Bergen, Norway.
Supervisor: Dr. Mateus de Oliveira Oliveira
Description: Implemented functionality related to treewidth and tree decomposition.

Sep. 2019 – Sep. 2020 **Undergraduate Researcher**, *School of Computing*, University of Utah.
Supervisor: Dr. Blair D. Sullivan
Description: Improved heuristics and approximation algorithms for Vertex Cover and Odd-Cycle Transversal with fixed-parameter tractable algorithms.

Publications and Preprints

[1] "QEDBench: Quantifying the Alignment Gap in Automated Evaluation of University-Level Mathematical Proofs". In: *ICML 2026*. Also presented at the 3rd AI for Math Workshop at ICML 2026. 2026.

[2] Alvaro Carbonero, Willem Fletcher, Jing Guo, András Gyárfás, Rona Wang, and Shiyu Yan. "Crowns in Linear 3-Graphs of Minimum Degree 4". In: *The Electronic Journal of Combinatorics* 29.4 (2022), P4.17.

Funding and Grants

November 2025 **Tinker Research Grant**, *Thinking Machines Lab*, **$5000 USD** API credits.

October 2025 **Catalyst Grant**, *Cohere Labs*, **$500 USD** API credits.

Honours and Awards

Fall 2022 – Spring 2024 **ALGANT Excellence Scholarship**, *ALGANT*.

April 2020 **Undergraduate Research Scholar**, *University of Utah*.

Open Source Contributions

June 2023 – May 2024 **SageMath**, *Free open-source mathematical software system.*
June 2022 – Oct. 2022
`https://www.sagemath.org/`

Nov. 2021 – Feb. 2022 **Nyxt Browser**, *Keyboard-driven web browser written in Common Lisp.*
`https://nyxt.atlas.engineer/`

Software

May 2024 **count-graph-homs**, *SageMath library for graph homomorphism counting.*
`https://github.com/guojing0/count-graph-homs`

February 2020 **turbo-oct**, *Turbo-charging Odd-Cycle Transversal with fixed-parameter tractable (FPT) subroutines.*
`https://github.com/guojing0/turbo-oct`

Personal Projects

February 2026 — **IMO Math Agent**, *An AI agent pipeline system for solving IMO problems, inspired by the IMO25 project.*
Code: `https://github.com/guojing0/imo-math-agent`
Post: `https://guoj.org/imo-math-agent.html`

August 2025 — **Smol MoE Language Model**, *Implemented a small MoE language model (Switch Transformer), upcycled a dense LLM into a MoE model (sparse upcycling), and continued pretraining this MoE model.*
Code: `https://github.com/guojing0/cohere-scholar-take-home-2026`

Professional Service

Reviewer — **Third AI for Math Workshop**, *ICML 2026.*

Professional Activities

July 2026 — **Lean Summer School & AI for Math Workshop**, *Zhejiang University*, Hangzhou, China.

January 2026 — **AI for Math Winter School**, *Tongji University*, Shanghai, China.

September 2024 — **Trieste Algebraic Geometry Summer School (TAGSS) on Tropical Geometry and Related Topics**, *The Abdus Salam International Centre for Theoretical Physics (ICTP)*, Trieste, Italy.

July 2024 — **Conference on Tropical and Non-Archimedean Geometry**, *Universität Regensburg*, Regensburg, Germany.

June 2024 — **Additive Combinatorics Summer School**, *Erds Center, Rényi Institute*, Budapest, Hungary.

February 2024 — **Thematic Month on Discrete Mathematics & Computer Science: Groups, Dynamics, Complexity, Words**, *CIRM*, Marseille, France.
Workshop on Randomness, Information, and Complexity

August 2023 — **Copenhagen Summer of Counting & Algebraic Complexity**, *Department of Computer Science, IT University of Copenhagen*, Copenhagen, Denmark.

July 2023 — **Summer School in Mathematics**, *Institute of Mathematics, Eötvös Loránd University*, Budapest, Hungary.
Paradoxical decompositions, fractals, and dynamics

June 2023 — **Foundations of Computational Mathematics 2023**, Paris, France.

July 2018 — **The Racket Summer School**, Salt Lake City, UT, USA.

Talks

April 2024 **Seminar on Mathematical Communication**, *Universität Regensburg*.
History and recent developments of Roth's theorem and its Fourier analytic proof.

November 2023 **Seminar on Fourier analysis and representation theory**, *Universität Regensburg*.
Measure theory, Radon and Haar measures, L^p spaces, and modular functions.

July 2023 **Seminar on Modular Forms and Representations**, *Universität Regensburg*.
The gamma function, Dirichlet series, and local zeta and L-functions.

June 2023 **Seminar on CAT(0) Cube Complexes**, *Universität Regensburg*.
Median graphs, hyperplanes, and their equivalence with CAT(0) cube complexes.

June 2023 **Seminar on Turing machines, lambda calculus, and proofs as programs**, *Universität Regensburg*.
Register machines, Turing computability, and recursive functions.

February 2023 **Seminar on Open Covers and Complexity**, *Universität Regensburg*.
Topological complexity of the root-finding problem and its relation to sectional category.

December 2022 **Seminar on Lattice-Based Cryptography**, *Universität Regensburg*.
Worst-case to average-case reductions based on Gaussian measures.

Research Visits

August 2023 **Department of Computer Science, IT University of Copenhagen**, Copenhagen, Denmark.

February 2023 **Department of Mathematics, Czech Technical University**, Prague, Czech Republic.

Other Information

Programming Python, Common Lisp, Racket/Scheme, Lean, Ruby, Java, C/C++, and LaTeX

Technical skills Codex / Claude Code, PyTorch, Django, Flask, and Linux

Languages Chinese, English, German (Basic), and Russian (Basic)